ServiceInsights

FOR INDEPENDENT SERVICE CENTERS

Genuine GM | Parts | ACDelco

JAN–MAR 2012

Still the Best in Truck Leadership, Design and Performance

▶ GMC Sierra, Chevrolet Silverado

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More on the GMC and Chevrolet Trucks inside including service procedures

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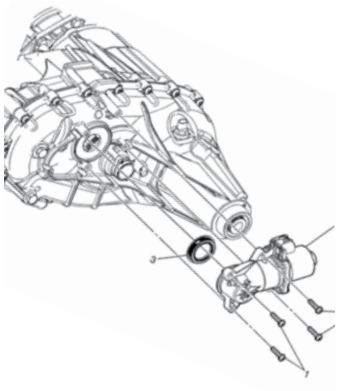

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GM Promotions Update

overPOWER Expands

Parts program is an overwhelming success for customers.

Already offering superior products, GM Customer Care & Aftersales continues to address the other half of the parts purchase calculation: price.

In the third quarter of 2011, over 300 part numbers were added to the overPOWER The Competition pricing program designed to make OE powertrain parts equally attractive from a price standpoint.

> Targeting aftermarket competitors selling parts of cheaper quality and price, the overPOWER initiative enters 2012 with over 1,600 distinct part numbers spanning a broad range of engine and transmission assemblies and components.

Using overPOWER, participating dealers are able to offer Independent Service Center (ISC) customers competitive prices on OE Service Parts that can make the difference between a job done cheaply and one done right.

Reiterating the value of Genuine GM Parts beyond major engine and transmission assemblies, GM Customer Care & Aftersales has been emphasizing component parts in the course of fleshing out the overPOWER program. Much of the increase in overPOWER-qualifying parts numbers for 2011 came in the form of parts typically needed to fully complete a powertrain overhaul, replacement or rehab. Some 550 parts numbers in categories ranging from pulleys and balancers, 4WD actuator motors and engine cooler lines to intake manifolds and gaskets, cylinder heads and clutch kits now comprise the component parts family.

"This is a huge opportunity for dealers: to get more parts needed to round out a big repair job into the hands of ISCs who may not know the opportunity they have to get competitively priced OE Service Parts," says Amy Buzan, wholesale dealer channel specialist.

With more dealers taking part in the overPOWER program, ISCs have more opportunities than ever to offer Genuine GM Parts to customers – from top to bottom.

Two new GM engine families join reman cylinder head line-up.

OHC cylinder head repair jobs for GM vehicles powered by High Feature V6 and LLR 3.7L Inline 5 engines can now be performed with remanufactured – and now value-priced – Genuine GM Parts cylinder head assemblies.

Complete assemblies, remanufactured to exacting GM specifications, are available for repairs to these popular models:

- Many late-model Buick Rendezvous, LaCrosse and Allures, Cadillac CTSs and SRXs and Saturn Vues equipped with HF V6s.
- GMC Colorado and Canyons with Inline 5s.

Complete Engine – 2005 3.5L V6 VVT (LY7) RWD for Cadillac SRX

I5 Cylinder Head Assembly

Coincident with the new applications, GM Customer Care & Aftersales is announcing more competitive pricing for all reman cylinder head assemblies, including previously introduced reman assemblies 2.2L Ectoec, 4.2L Inline 6 and 3.5L Inline 5 and 2.8L Inline 4 engines used in many late-model vehicles.

Lower Pricing, 12-month/12,000-mile Warranty

Lower pricing, along with the assurance of remanufacturing done to exhaustive and detailed GM reman standards and the protection of a 12-month/12,000-mile warranty, gives Independent Service Centers (ISCs) another reason to consider the reman option.

Quality is a particularly important variable when it comes to OHC heads because they're more highly engineered than OHV heads. Properly done, remans are a better bet to secure quality and reliability than simple rebuilds.

"OHC heads have a lot more complexity in castings, machinings and components," says Keith Loch, product specialist with GM Engines and Transmissions. "We advise rebuilders and ISCs to use OE OHC heads and to use a reman product as opposed to sourcing a rebuilt product."

In going well beyond a typical head-rebuild, GM produces remanufactured assemblies from previously manufactured heads, adding new key components like camshaft retaining caps, intake and exhaust valve seats and valve springs, oil seals and guides. Reflecting OEM updates and technical service bulletins, the "design-enhanced" assemblies conform to full and current OEM specifications.

As close to brand new as you can get, and now priced to be competitive with rebuilt heads, GM's reman cylinder head assemblies give ISCs what might be the ideal middle-ground solution.

"The most important thing these offer is the ability to get the job done right the first time," Loch says. "With these heads, you get something remanufactured and enhanced, not something just rebuilt and sold as a fixed cylinder head."

Present at the Creation

GM Performance Build Center lets LS7/LS9 buyers help assemble their masterpiece.

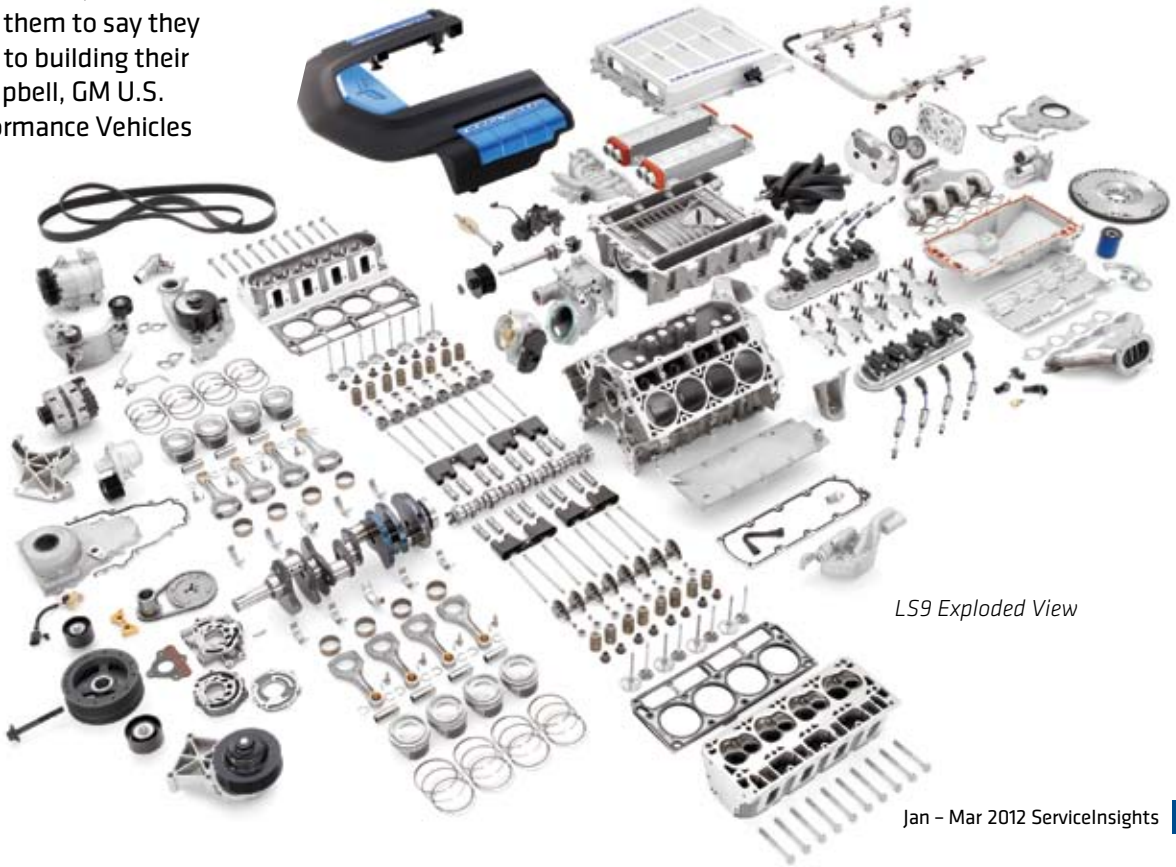
Consumer trend watchers say they detect a growing interest in buying "experiences," not just products. Now, buyers of special parts number versions of an LS7 (19259944) or LS9 (19259945) engine purchased through a Chevrolet Performance dealer can spend a day building the exact engine they'll put in their vehicle with an engine builder at the GM Performance Build Center in Wixom, Mich.

In the daylong, start-to-finish build process, the builder guides the buyer through the hands-on process of assembling the engine's key components. From installing the crankshaft in the cylinder block to installing the intake system to installing a supercharger (LS9 only), the buyer not only sees how it's done, but actually does it.

"For hands-on hot rodders, this program truly enables them to say they did it all when it came to building their project," says Jim Campbell, GM U.S. vice president of Performance Vehicles and Motorsports. "There's nothing else like it in the industry."

At day's end, the buyer has a blend of a unique experience, in-depth knowledge of how an engine is built, and a fully-warranted, high-performance engine owned in more ways than one; the final touch is a personalized nameplate affixed to the engine along with the builder's signature.

The program lets the buyer glimpse a true rarity in the production engine industry – a hand-assembly process – something that might excite even the most experienced engine builders.



LS9 Exploded View

GM OE Service Parts Update (cont'd.)

The new program is patterned after and closely similar to GM's Corvette Engine Build Experience that has brought nearly 20 buyers of Corvette Z06 and ZR1 engines to Michigan for a similar experience. The parts and procedures used in the Corvette program and the LS7 and LS9 program are identical.

While the process of engine building may not be new or novel to many hot-rod builders or restorers, the Chevrolet Performance Engine Build Experience truly offers aficionados a chance to put a notch of a different kind in their belts. Many classics restorers and engine builders can rightly flash some of their own credentials as master builders, but the experience of not only seeing their engine built, but also participating, is hard to duplicate.

"The builder and the customer go step-by-step through the process," says Cliff Cohen, Chevrolet Performance marketing manager. "This is not an assembly line where the engine moves from one worker to the next. This is done in a spotless facility where the builder has his own set of stations to work on the engine block."

▶ ***Large photo below:*** *On Dec. 5, 2011, Don Henley, left, engine builder at the GM Performance Build Center, assisted Jeff Kasper, the first ever customer of the Chevrolet Performance Engine Build Experience.*

ACDelco TechConnect

Tech2Win Application Puts the Tech 2 on Your Computer

Tech2Win, a PC-based application version of the Tech 2 and CANdi (Control Area Network diagnostic interface) module, will be available soon for the aftermarket. Tech2Win can be loaded onto a service department PC or notebook computer via TIS2Web. While not a replacement for the Tech 2, it's a new resource that provides additional convenience and diagnostic capability.

When using the Tech2Win application, vehicle communication is performed using the Multiple Diagnostic Interface (MDI) tool. It enables technicians to take advantage of the computing power of their PC or notebook computer as well as the speed of the MDI, providing faster operation than a Tech 2 with a CANdi module.

In addition, loaded on a notebook computer, Tech2Win can be used during a vehicle road test, offering a larger screen with all of the Tech 2 tool functionality. It also supports touch screen functionality. If the computer with the Tech2Win application has a touch screen, all Tech2Win functions can be accessed via the touch screen.

Tech2Win Features

The Tech2Win application offers all of the features and functions of the Tech 2. Tech2Win:

- Is used for diagnostics only. Service programming is still performed through the TIS2Web Service Programming System (SPS).
- Includes the same vehicle coverage as the Tech 2. (GDS 2 must be used when servicing GM Global A vehicles, which currently includes the Chevrolet Camaro, Equinox, Cruze, Volt, Sonic; Buick LaCrosse, Regal, Verano; GMC Terrain; and Cadillac SRX).
- Requires a license that must be updated every 30 days.
- Requires PC and notebook computer specifications that meet or exceed the current minimum GM Techline hardware specifications. Review the latest specifications and guidelines at www.gmdesolutions.com.

Installation

The Tech2Win application can be installed on multiple PCs in the shop. There is no limit to the number of installations, but each PC requires the monthly license update through TIS2Web.

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ON THE WEB

- www.acdelcotechconnect.com, click the *TechConnect* Magazine link, or
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Power Steering System Service

Customers that bring their vehicles into a service center with a power steering system issue often mention noise, leaks and intermittent power assist. But, in many cases, these symptoms are the result of system contamination and incorrect fluid use, which are two significant causes of power steering pump failure if left unchecked.

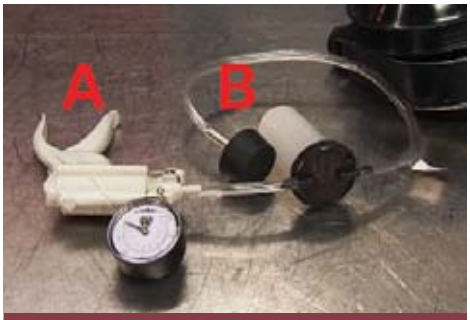
On most modern steering systems, brake fluids or transmission fluids may not be compatible with pump components. Using the wrong fluid could cause hose and seal damage, leading to fluid leaks and/or noise. Only use new, clean power steering fluid as recommended by the Original Equipment Manufacturer (OEM).

Different fluids are specified by manufacturers to meet the operating requirements of their power steering systems. Check the specific manufacturer's Service Information for the correct fluid to use.

Keep in mind that fluid color is not an indicator of fluid condition. Regardless of the original color of new fluid, power steering fluid may darken in color during use.

Power Steering System Bleeding

Check for any loose connections in the steering system. Loose connections may not leak, but could allow air into the system. After service, all air must be bled from the system in order to verify proper system operation and determine the correct fluid level. Pump noise is typically the result of air being drawn into the system on the suction side of the pump, causing cavitation, or air bubbles in the system.



A. J 42485 hand vacuum pump
B. J 43485 bleeding adapter

A new power steering bleed kit is available on a limited basis from ACDelco that can bleed the system more effectively. Contact your local ACDelco representative for more information. The kit includes bleeding adapter J 43485, which is used with tool J 42485 (MityVac hand vacuum pump) to remove air from the steering system.

During the bleeding procedure, be sure to maintain the fluid level to the full cold level. Use the adapter and MityVac to apply a vacuum of 20 in. Hg maximum for five minutes. Typically, vacuum should not drop more than 2–3 in. Hg. Verify the fluid level, fill if necessary, and then apply vacuum again. Next, check the fluid level once again; then start the engine and turn the wheel to allow the system to reach a normal operating temperature. Repeat the procedure until the fluid level stabilizes.

To view a video of the bleed procedure, go to acdelcotechconnect.com. Click the Product Information tab > Technical Product Service Aids.

Flushing the System

If replacing a power steering pump, flushing the system with new fluid will help eliminate any residual contaminants from causing future pump failure. Contaminated fluid may cause low or no pressure from the power steering pump as a result of the relief valve that stops functioning. Use the proper special tools (if applicable) and Service Information instructions to flush the system. Always flush the power steering fluid in the lines before removing an old or damaged pump.

Use the adapter and vacuum pump to apply a vacuum to the system.

Training Tips

Along with the Power Steering System Bleed Procedure, other online videos covering power steering system service can be found on acdelcotechconnect.com.

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ACDelco TechConnect

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ACDelco TechConnect is published bi-monthly and online for technicians to provide timely service information, increase knowledge and improve the performance of the service center.

ACDelco 360 represents our mission to look at our businesses at every possible angle to provide value and assistance to our distributors and their customers as well as offer a full circle of support with programs, tools, training and marketing focused on enhancing and growing our partnership successfully.

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ACDelco service tips are intended for use by professional technicians, not a "do-it-yourselfer." They are written to inform those technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions and know-how to do a job properly and safely. If a condition is described, it cannot be assumed that the information applies to all vehicles or that all vehicles will have that condition.

All materials and programs described in this magazine are subject to change. Submission of materials implies the right to edit and publish. Inclusion in the publication is not necessarily an endorsement of the individual or the company.

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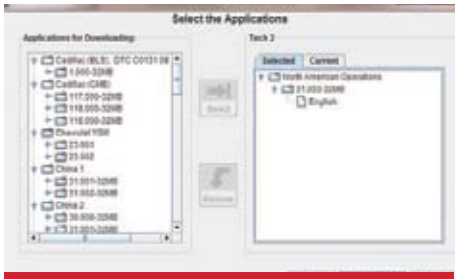
Tech2Win Application — continued from page 1

After installing the Tech2Win application, a software download also is required to download the diagnostic software for the desired vehicle coverage, including GM North America and Saturn ASTRA.



The diagnostic software for the desired vehicle coverage must be downloaded.

To install the application:

1. Connect the MDI to the computer. Power it using the AC adapter.
2. Select the Tech 2 software download on TIS2Web. A prompt will ask if you want to install Tech2Win.
3. Install the Tech2Win application using all the default selections. Installation should take less than 10 minutes.
4. Two icons will be placed on the PC desktop — a shortcut for Tech2Win QuickStart and a shortcut for the Tech2Win Configurator, which is used for multiple versions of Tech2Win depending on the vehicles being serviced.

After the application installation is complete, the diagnostic software for the desired service coverage and software license must be obtained. To download:

1. Click the Tech2Win QuickStart icon that is now on the PC's desktop.
2. Since Tech2Win does not have a current license, a license dialog box will appear. Click OK.
3. When the MDI is detected, a dialogue box will direct you to select the vehicle communication interface.
4. To initiate the software license and install the diagnostic software, select the Software Download (SWDL) on TIS2Web and click Start Software Download.
5. Select Tech2 and Custom for the update mode.
6. Select the desired diagnostic software package. Available packages include the latest GM North American coverage as well as Saturn ASTRA.
7. Click Download to begin downloading the diagnostic package just like for a Tech 2. Current progress and Tech2Win will display during the download.

After the download is complete, the license countdown in the lower right corner will be updated to 30. This is the number of days until the license must be renewed. When the license expires, an expiration message will be displayed. To renew the license, use the security access service or update the diagnostic software using the standard update mode.

License counter

Tech2Win uses Communication Port (comm port) 9 on the PC. If this port is used for other devices, switch the comm port setting by selecting the Tech2Win Configurator icon on the desktop.

When using Tech2Win, click the selections on screen or click the soft buttons on the screen where applicable.

Tech2Win activity is shown between the vehicle, MDI, Tech2Win and the PC

Tech2Win activity between the vehicle, MDI, Tech2Win and the PC is shown on the bottom of the screen.

Refer to the Quick Reference Guide for complete installation information and operating details. To access the Quick Reference Guide, go to TIS2Web News and select the Tech2Win Quick Reference Guide.

The subscription options for the Tech2Win application are:

$55 for 3 days

$225 for 1 month

$550 for 1 year

The TIS2Web subscription for one year is $1,395.

Go to www.acdelcotechconnect.com and click the GM Service Information link on the home page for more information.

– Thanks to Mike Waszczenko and Bob Stewart

Power Steering System Service — continued from page 2

Click the Product Information tab > Technical Product Service Aids to view the following videos:

- Advanced Steering System Diagnosis – Introduction
- Power Steering System Overview
- Power Steering System Flush Procedure
- Power Steering System Pulley Removal and Installation
- Power Steering Pump Warranty Analysis
- Power Steering Pump Service Considerations
- Power Steering System Quality Improvements
- Advanced Steering System Diagnosis - Summary

– Thanks to Rick Balabon

Fuel Contamination in Returnless Fuel Systems

Common additives in gasoline today include detergents, corrosion inhibitors, demulsifiers, deposit controls, antioxidants and metal deactivators. The focus of these additives is on emissions reduction through better engine performance. These additives are regulated to ensure that the finished fuel will not contribute to fuel system failure. However, additive breakdown in gasoline can result in fuel system contamination, poor engine performance and eventual failure of the fuel pump and other components.

In fact, since the Environmental Protection Agency (EPA) first established the minimum additive performance standards in 1995, most gasoline marketers have actually reduced the concentration level of detergent additive in their gasoline by up to 50%.

As with fuel additives, modern returnless fuel systems also were developed to lower emissions. By not returning hot fuel from the engine to the fuel tank, the internal temperature of the fuel tank is reduced, lowering evaporative emissions. But since the returnless fuel system does not have a fuel return line that returns fuel back to the fuel tank, it is easier for fuel contaminants to become trapped in the fuel rail and cause engine misfires and other performance conditions.

4-Cylinder Engines

An example of fuel contamination may be found on some late model GM vehicles equipped with a 4-cylinder engine, including 2003-2010 Vibe, ION; 2004-2005 Cavalier, Sunfire; 2004-2010 VUE; 2004-2011 Aveo; 2004-2012 Malibu; 2005-2010 Cobalt; 2006-2010 G6; 2006-2011 HHR; 2007-2010 G3, G5, AURA, AURA Hybrid, VUE Hybrid; 2008-2009 Astra; 2010-2012 LaCrosse, Equinox, Terrain; 2011-2012 Regal, Cruze; and 2012 Sonic models (engine RPOs 2H0, L61, L91, LAF, LAP, LAT, LAX, LAY, LE5, LE8, LE9, LHU, LNF, LNK, LSJ, LUJ, LUU, LUV, LUW, LV6, LXT, LXV).

An intermittent engine misfire may occur on cylinder 1 during or following a left turn or on cylinder 4 during or following a right turn. The misfire may typically last up to 10 seconds.

Any fuel contaminants that make it to the fuel rail tend to gather over the #1 fuel injector inlet when turning left and over the #4 fuel injector inlet when turning right. Some random misfires at idle also may occur on the cylinder next to the fuel feed line (#1 or #4 depending on the model) as contaminants enter the fuel rail from the fuel tank.

If fuel contamination is suspected for these models, the inside of the fuel rail and fuel tank should be inspected for fuel contamination. If this condition occurs intermittently, it is unlikely that fuel contamination would be found by simply taking a fuel sample from the fuel feed line/fuel pressure test port. Typically, it will be necessary to turn the engine off as the misfire is occurring, carefully remove the fuel rail (while keeping the fuel in the rail), and drain it into a clear container for inspection.

Inline Truck Engines

Another example of fuel contamination may be found on some GM trucks and SUVs equipped with an inline 2.8L, 2.9L, 3.5L, 3.7L, or 4.2L engine (engine RPOs LK5, LLV, L52, LLR, LL8). These models include the 2005-2007 Rainier; 2005-2009 TrailBlazer, Envoy; 2006-2010 H3; and 2006-2012 Colorado and Canyon.

If the engine misfires, possibly when coming to a stop or during acceleration, it may be caused by contaminated fuel. Fuel contamination may cause a misfire on cylinder 1 during or shortly after deceleration, or on the opposite end cylinder during or following hard acceleration.

Due to the returnless fuel rail system, fuel contaminates may become trapped in the fuel rail and eventually pass through the #1 fuel injector during deceleration and through the opposite end fuel injector on acceleration. The injector at the end will depend on the RPO of the engine. The inside of the fuel rail and fuel tank should be inspected for signs of fuel contamination.

Deposits on an intake valve (right) from an engine using gasoline with the legal minimum additive.

If the vehicle is driven for an extended time with contamination in the fuel rail, it may result in a sticking valve. If sticking valves are a concern after cleaning the fuel system, the valves can be cleaned following the cleaning procedures in the appropriate Service Information. The vehicle should be driven a minimum of 50 miles (80 km) before evaluating the vehicle again in order to allow the fuel additive to work.

The entire fuel system should be flushed and the fuel tank removed, emptied and cleaned. If the fuel tank is only drained, the condition may return within a few hundred miles.

Fuel System Cleaning

If fuel contamination is present, refer to the fuel system cleaning procedures in the Service Information and clean the inside of the fuel tank, fuel lines, and fuel rail. Once the entire fuel system is cleaned and reassembled, the fuel injectors also should be cleaned.

Any time fuel contamination is the cause of an engine performance condition, advise customers to only use fuel from high quality, high volume TOP TIER gasoline stations. General Motors, BMW, Honda, Toyota, Volkswagen and Audi developed the standards for the TOP TIER detergent gasoline in 2004 when it was determined that the current EPA minimum detergent requirements do not go far enough to ensure optimal engine performance.

For a current list of gasoline brands that meet the TOP TIER standards, visit www.toptiergas.com.

– Thanks to John Kopec and Alan Salisbury

The New Caprice Police Patrol Vehicle

Chevrolet recently began deliveries of the new 2011 Caprice Police Patrol Vehicle (PPV) to fleets and municipalities. Available as an unmarked Detective model (RPO 9C3) and as a Police model (RPO 9C1), these Caprice models are essentially alike, differing only in details specific to the needs of detectives or patrol officers. The Caprice PPV was developed specifically for law enforcement with input from police officers.

Powertrain

Initially, all Caprice PPVs will be delivered with a 6.0L V8 engine (RPO L77).The V8 engine produces 355 HP and 384 lb.-ft. of torque. It features E85 FlexFuel capability and Active Fuel Management. The air conditioning is cut off at wide-open throttle.

Engine oil, transmission and power steering coolers are all standard, as are electric cooling fans and ethylene-propylene-diene monomer (EPDM) coolant hoses.

The oil-to-coolant engine oil cooler system is mounted on the left side of the lower engine block forward of the oil filter.

A six-speed 6L80E automatic transmission is used. It provides protection against over-revving when low gear is manually selected. A Sport shift mode — providing delayed upshifts and earlier downshifts, when maximum engine power and transmission responsiveness are required — can be accessed by pressing the Sport Mode button in front of the shift lever (RPO 9C1 Police model) or moving the shift lever over from D (Drive) to the right quadrant (RPO 9C3 Detective model).

The 2011 rear drive Caprice PPV V8 is equipped with a 2.92 rear axle ratio with a standard limited slip differential.

Traction Control is deactivated when the Police Performance mode is engaged.

Body, Chassis and Suspension

The unitized body structure features extensive use of high strength and ultra-high strength steel and engineered energy load paths to enhance crash protection.

A Flexible Front End Module (FEM) design creates simpler and faster damage repair. Compared with traditional front end designs that have welded upper cross members, beams and radiator supports, the Caprice PPV features a bolt-on and -off design that saves repair costs due to a reduction in cutting, welding and painting. With the FEM removed, a walk-in front end allows easier repair and servicing of major body and engine components.

Flexible Front End (FEM) Module

A standard four-wheel independent suspension with front and rear stabilizer bars features heavy-duty components.

Wheels are heavy-duty steel and mounted with speed-rated P235/50R18 blackwall tires. A compact spare is included. Recommended tire pressure is 39 psi/269 kPa (front) and 44 psi/303 kPa (rear).

A full-size spare tire is available, but the Tire Pressure Monitor (TPM) sensor is not programmed. This accommodates fleet usage, in which spare tires may be frequently switched from vehicle to vehicle.

Four-wheel anti-lock heavy-duty disc brakes are used, and are police-calibrated. Brake rotors are 13.58 inches in diameter.

Vehicles are shipped with protection covers on the brake discs of the rear wheels only. With the vehicle on a hoist, rotate the wheel while at the same time pulling the torn end of the cover away from the brake disc and wheel. Ensure that all material is removed and repeat for the other wheel (PDI at the dealer).

Electrical System

For diagnostic purposes, communication with both models is done using the Tech 2 and CANdi module. GDS 2 does not communicate with the Caprice.

The electrical system is powered by a 170-amp high output generator with idle boost (transmission in Neutral or Park).

A 110-amp ignition and main power supply wiring harness is located under the lower right side of the instrument panel. One 50-amp battery power circuit and two 30-amp relay controlled circuits are in a five foot coil provided for customer connection. Included in the harness are signal circuits for ignition power (HOT in START/RUN and ACCESSORY/RUN), vehicle radio mute, vehicle speed signal and park-enable.

There is also a 120-amp power supply in the trunk with a ground stud.

The primary battery is located in a compartment on the driver's side of the trunk. An external vent carries gases outside the passenger compartment. If the battery is replaced, be sure the replacement battery incorporates the external ventilation feature and be sure the ventilation tube is properly installed.

Primary battery in trunk location with blue transit isolation connector

To ensure that the battery is delivered in the best possible condition, a blue transit isolation connector is located above the battery in the vehicle trunk. When the vehicle is shipped, it is disconnected in 2011 model year vehicles,

continued on page 6

Caprice Police Patrol Vehicle

— continued from page 5

isolating circuits that contribute to parasitic battery drain. This connector should remain disconnected if the vehicle is stored for a period of time.

The transit isolation connector must be connected to enable operation of the radio, HVAC, instrument cluster, and central locking. Connect the two blue mating connectors until a click is heard. After connecting, lightly pull to confirm the connection and that the connector halves cannot be easily separated.

An auxiliary battery with 600 CCA and 70-amp hour rating is available to power customer-installed accessory equipment. It is located on the passenger side of the trunk and also has an external vent. The auxiliary battery is connected to the vehicle's charging system through an isolation relay to prevent electrical loads from depleting the primary battery if the engine is not running and the ignition is off.

Special Features

The Caprice PPV is available with several unique standard or optional features, including:

- Stealth Mode – Exterior and interior lamps can be turned off by momentary rotation of headlamps switch to OFF (U.S. only).
- OnStar – The Caprice PPV is not equipped with OnStar.
- Remote Keyless Entry – When the Unlock or Lock button is depressed, no exterior lamps or audible sounds are activated; however, the interior standard equipment dome lamp will illuminate at night unless option 7Y6, inoperative dome and courtesy lamps, is ordered.
- Infotainment – The Map, Nav, Aux, and Media buttons on the AM/FM radio are inoperable for all North American Caprices.

– Thanks to Ange Girolamo and Brad Thacher

Updated ABS Operation and Diagnosis Training Course

The variations and advancements of Antilock Braking Systems (ABS) have led to increasing numbers of components that aid vehicle braking and more. From Dynamic Rear Proportioning (DRP) and the Traction Control System (TCS) to the Vehicle Stability Enhancement System (VSES) and Electronic Brake Distribution (EBD), ABS has developed into much more than simple wheel speed sensors sending signals to an Electronic Brake Control Module (EBCM).

Technicians looking to learn more about DRP, TCS, VSES and EBD should check out the updated ABS Operation and Diagnosis Instructor-led Training (ILT) course, S-BK05.02.01ILT, now being scheduled at ACDelco training centers.

The ABS Operation and Diagnosis course covers:

- An introduction to ABS brakes
- ABS operation
- Base brake components
- ABS common system components
- ABS description and operation
- Diagnosis and service

ABS Operation

In the course, participants will learn the basic factors that affect braking and wheel slip. There are two types of wheel slip: negative slip, which occurs during braking, and positive slip, which occurs during acceleration. It's the job of the ABS system to maintain the optimum negative wheel slip for the best braking. The traction control system uses components of the ABS system to control positive wheel slip for optimum acceleration.

The control strategies employed by the ABS system also are covered. For example, the course reviews how the EBCM uses inputs from the wheel speed sensors to calculate wheel speed, the lateral accelerometer sensor as an indication of vehicle lateral acceleration, the yaw rate sensor as an indication of vehicle yaw rate and the steering wheel position sensor as an indication of the position and rotation of the steering wheel. Using these calculations, the EBCM can command the Brake Pressure Modulator Valve (BPMV) to direct fluid to each wheel.

Diagnosis and Service

Diagnostics covered in the course include using a scan tool to check Diagnostic Trouble Codes (DTCs) as well as checking the amperage output from an active Wheel Speed Sensor (WSS). A variety of service resources also are highlighted that can help technicians in analyzing ABS/TCS parameters.

In addition, the yaw rate reference table reset procedure is discussed. If the data in the yaw rate sensor/lateral accelerometer data table, which is used to determine how the VSES operates, becomes unreliable, false VSES activations or poor VSES performance can occur.

The ABS system helps control negative and positive wheel slip.

Learn More

ACDelco offers on-demand Web-based Training courses (WBT), instructor-led Virtual Classroom Training (VCT) courses and a variety of hands-on, Instructor-led Training (ILT) courses in addition to ABS Operation and Diagnosis at training centers around the country. To review the latest training courses available, log in to the ACDelco Learning Management System (LMS) at www.acdelcotraining.com.

– Thanks to Greg St. Aubin

The following technical tips provide repair information about specific conditions on a variety of vehicles. If you have a tough or unusual service repair, call ***1-800-825-5886, prompt #2****, to speak with a technical expert with the latest OEM information.*

Extended Diagnostic Hotline Hours

The Technical Hotline is available to help technicians with a variety of technical repairs. Now, ACDelco is here to help even more with expanded hours of operation for the Diagnostic Hotline. Technicians can call 1-800-825-5886, prompt #2, for assistance from 8 a.m. to 8 p.m. ET Monday–Friday.

Intermittent Brake Lights

2004-2008 Chevrolet Malibu, Chevrolet Malibu Maxx; 2005-2009 Pontiac G6; 2007-2009 Saturn AURA; 2008 Chevrolet Malibu Classic; 2008-2009 Chevrolet Malibu

High resistance in the Body Control Module (BCM) C2 or X2 connector (specifically pins 18, 31 and 59) due to terminal fretting corrosion may cause intermittent brake light operation. Other conditions may also include extended pedal travel required to shift out of Park, cruise control that does not function correctly, and DTC C0131, C0161 and/or C0277 may be set.

Do not replace the BCM for this condition.

Disconnecting the C2 or X2 connector, adding dielectric lubricant (clear gel), GM P/N 12377900, (apply with a one-inch nylon bristle brush). and reconnecting the connector will correct the high resistance condition due to terminal fretting corrosion.

Use a scan tool to check that the Brake Pedal Position Sensor (BPPS) ratio is equal to the BPPS learned home when the brake pedal is not depressed. If they are equal, the brake lamps should be operating correctly. If they are not equal, perform the Brake Pedal Position Sensor Calibration procedure in the appropriate Service Information to complete the repair.

New Design Cylinder Heads

2007-2009 Pontiac G6, Saturn AURA; 2007-2010 Saturn OUTLOOK; 2007-2011 Cadillac CTS, Cadillac SRX, Cadillac STS, GMC Acadia, Buick LaCrosse; 2008-2009 Pontiac G8; 2008-2010 Saturn VUE; 2008-2011 Buick Enclave, Chevrolet Malibu, Chevrolet Equinox; 2009-2011 Chevrolet Traverse; 2010-2011 Chevrolet Camaro; equipped with the 3.6L (RPO LY7, LLT), 2.8L (RPO LAU) or 3.0L (RPO LF1, LFW) V6 engine

When replacing cylinder heads on a High-Feature V6 engine, do not use shims/spacers with the 2011 new style "saddle cap" cylinder head. Use of shims/spacers on this head can cause damage to the cylinder head and actuators. Also, the camshaft actuators specifically for the new design head for your application must be used.

New design saddle cap cylinder head

Previous design cylinder head

The new saddle cap design cylinder heads will not work with the 2004-2006 engines and first design 2007 engines. All timing components and calibrations are different.

Navigation System Vehicle Location after a Power Loss

2012 and prior GM passenger cars and trucks

The navigation radio may not display the vehicle location icon on the map accurately after the radio or battery has been replaced or after battery power has been removed from the radio. The vehicle location icon accuracy also may be degraded if the GPS signal is not available and the GPS displayed icon has a red line through it.

The navigation radio does not keep learned GPS information or gyroscope and vehicle speed signals stored when the battery power is removed from the radio. The navigation radio continually uses GPS, gyroscope and vehicle speed data to maintain the vehicle location icon positioned accurately on the displayed map. There may be periods of time during a drive cycle when the GPS signal may not be available and the vehicle location icon still appears to be accurate. This is due to the radio having internal gyroscopes and receiving a vehicle speed signal to maintain accuracy if the radio had received a good GPS signal earlier in the drive cycle.

Normal driving will improve the accuracy of the vehicle location icon on the displayed map. It may be necessary for the vehicle to be driven up to 25 miles (40 km) with 15 left and 15 right turns while the vehicle location icon is matched to roads on the displayed map.

Product Information

For free technical assistance and product information regarding specific ACDelco products, contact these toll-free information hotlines staffed by ASE-certified technicians:

Brakes – 1-888-701-6169 (prompt #1)
Chassis – 1-888-701-6169 (prompt #2)
Clutches – 1-888-725-8625
Lift Supports – 1-800-790-5438
Shocks – 1-877-466-7752
Starters and Alternators – 1-800-228-9672
Steering (Pumps, Rack and Pinion, Gears) – 1-866-833-5567
Wiper Blades – 1-800-810-7096

How to Take ACDelco Training

Go to **www.acdelcotechconnect.com** and click the **Training tab** to log in to the ACDelco Learning Management System (LMS).

- To enroll in an **Instructor-Led Training (ILT)** course, click the Enrollment link or the Instructor-Led Courses link to view the catalog and select a specific course.
- To enroll in a **Virtual Classroom Training (VCT)** course, click the Enrollment link or the Virtual Classroom Training Courses link to view the catalog and select a specific course.
- To launch a **Web-Based Training (WBT)** course, click the Web-Based Courses link to view the catalog and select a specific course.
- To launch a **TechAssist (TAS)** course, click the TechAssists link to view the catalog and select a specific course.
- To launch a **Simulation (SIM)**, click the Simulations link to view the catalog and select a diagnostic challenge simulation.

Training Schedule

To search for currently scheduled courses, click the Schedule link. Select search terms from the dropdown menus and click the Submit button.

Current Virtual Classroom Training

The following VCT courses are currently being scheduled:

Course Number	Course Name
FVCT1.09V	How to Use VCT – Recorded
S-AC07-01.01VCT	HVAC System: Components and Lubricants
S-AC07-01.01VCT-R	HVAC System: Components and Lubricants – Recorded
S-AC07-02.01VCT	HVAC System: Operation and Service Hints
S-AC07-02.01VCT-R	HVAC System: Operation and Service Hints – Recorded
S-AC07-03.01VCT	HVAC System: Flushing, Recovery and Diagnostics
S-AC07-03.01VCT-R	HVAC System: Flushing, Recovery and Diagnostics – Recorded
S-AC07-04.01VCT	HVAC System: Engine Cooling, Controls and Communication
S-AC07-04.01VCT-R	HVAC System: Engine Cooling, Controls and Communication – Recorded
S-EL06-01.01VCT	Electrical Circuit Function and Diagnosis
S-EL06-01.01VCT-R	Electrical Circuit Function and Diagnosis – Recorded
S-EL06-02.01VCT	Testing Electrical Signal and Control Circuits
S-EL06-02.01VCT-R	Testing Electrical Signal and Control Circuits – Recorded
S-EL06-03.01VCT	Serial Data Communication Networks
S-EL06-03.01VCT-R	Serial Data Communication Networks – Recorded
S-EL06-04.01VCT	Communication Network Diagnosis
S-EL06-04.01VCT-R	Communication Network Diagnosis – Recorded
S-EL06-06.01VCT	GM Hybrid System Safety and Components
S-EL06-07.01VCT	GM Hybrid System Diagnosis and Repair
S-EM01-01.01VCT	Camshaft Position Actuator Systems
S-EM01-01.01VCT-R	Camshaft Position Actuator Systems – Recorded
S-EM01-02.01VCT	Active Fuel Management Operation
S-EM01-02.01VCT-R	Active Fuel Management Operation – Recorded
S-EM01-03.01VCT	Active Fuel Management Diagnosis
S-EM01-03.01VCT-R	Active Fuel Management Diagnosis – Recorded
S-EP08-01.01VCT	6.6L Duramax: Engine Diagnosis
S-EP08-02.01VCT	6.6L Duramax: LMM Diesel Engine
S-EP08-03.01VCT	6.6L Duramax: LGH and LML Diesel Engines
S-FN00-01.01VCT	How to Use VCT

Conduct a Group VCT Session at your Service Center

If you're looking to schedule a Virtual Classroom Training (VCT) course and would like to have your entire shop, or just a few technicians, view the course as part of an on-site training session, ACDelco can help.

A VCT course is live, real-time training, delivered over the Internet with interaction between the course instructor and all participants, just as in a real classroom.

Your ACDelco representative can help in setting up and managing the session in your service center. When a VCT course is scheduled, they are available to attend the course at your shop, assist in getting your computer system and headset with microphone set up for the VCT, and help answer any questions you may have during the training.

There are two ways to enroll in a VCT course. Search for courses in the ACDelco Learning Management System (LMS) at www.acdelcotraining.com by selecting Menu > Schedule > Search Course Sessions. If the course number is known, select Menu > Enrollment > Enroll Yourself in a Course Session.

A schedule of your VCT course enrollments is available by clicking the "You are enrolled in # VCT Classes" link on the ACDelco Training home page.

For more information about all of ACDelco's training opportunities, contact your local ACDelco representative.

– Thanks to Greg St. Aubin

Leading with Connect and Cruise, Chevrolet Performance emphasizes versatility, choice at SEMA 2011.

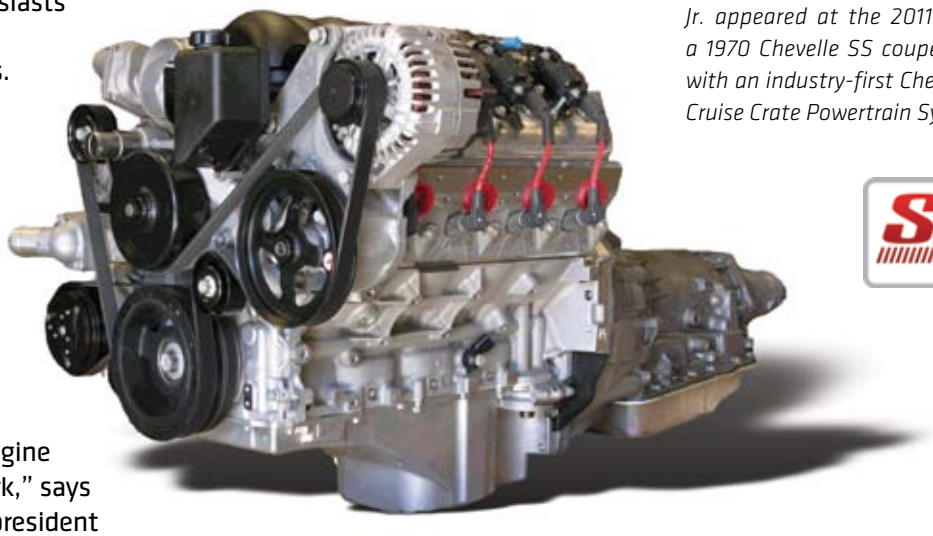
Touting Dale Earnhardt, Jr.'s endorsement of its groundbreaking new powertrain kit, Chevrolet Performance used the November Specialty Equipment Manufacturer's Association (SEMA) show to emphasize a clear commitment to the varying needs of the high-performance builder/enthusiast community.

Along with a new Connect and Cruise Crate Powertrain System that simplifies the task of ordering and installing crate engine/transmission/controller packages, Chevrolet Performance talked up new crate engines, controller kits, fuel pumps and the rebirth of a historic concept car at the event.

Connect and Cruise, which now consists of two engine/transmission kits (CPSLSA4L85E or CPSLS34L65E) – the LS3/4L65E and the LSA/4L85E – was formally introduced in the form of a restored 1970 Chevelle SS coupe Earnhardt helped GM engineers design. Outfitted with the LSA/4L85E package, the Earnhardt Chevelle was constructed from a GM-licensed reproduction body from Dynacorn International, Inc. It also sported a broad mix of trim and interior parts from other licensed GM Restoration Parts suppliers.

But the vehicle's chief role at SEMA was to promote Connect and Cruise, an initiative Chevrolet Performance sees as central to a strategy of catering to the subset of restorers and enthusiasts who value pre-selected, plug-and-play powertrain solutions. While many enthusiasts like the challenge and versatility associated with selecting and matching powertrain components on their own, others want to avoid that.

"You can save time and money by purchasing a single kit, while also eliminating the guesswork of matching a transmission to a powerful engine – our engineers did all the work," says Jim Campbell, GM's U.S. vice president



▶ *The Connect and Cruise Crate Powertrain System consists of a supercharged LSA engine and 4L85E automatic transmission combination that is factory-engineered and matched with all the electronic control modules, wiring harnesses and other key components.*

▶ *Team Chevy NASCAR driver Dale Earnhardt Jr. appeared at the 2011 SEMA show with a 1970 Chevelle SS coupe he helped design with an industry-first Chevrolet Connect and Cruise Crate Powertrain System.*

Repair Industry News & Updates (cont'd.)

of Performance Vehicles and Motorsports.

By purchasing everything needed in a kit through Chevrolet Performance dealers, customers get all they need for a quick, reliable installation with a single part number.

"Based on the feedback we were getting from the enthusiast community we put these complete packages together to help take the mystery out of the entire process, which may be important to some people," says Cliff Cohen, marketing manager for Chevrolet Performance. "There's still a market for traditional engine-building processes and the usual work that restorers and rebuilders do. This is just taking the mystery out of it for those who want a simpler process."

Chevrolet Performance carried on the theme of blending simplification and high performance with other announcements at SEMA 2011.

• A calibrated controller kit allowing easier adaptation of 2007-2009 versions of the 5.3L V8 to a range of hot rod projects;

• Another groundbreaking LS high-performance engine, the LS376/525, which marries the racing-derived ASA camshaft with the LS3 6.2L production engine. It now stands as the most powerful production-based crate engine in the Chevrolet Performance portfolio.

• An LSA controller kit that improves installation and operation of the 556-horsepower supercharged LSA crate engine in older vehicles.

• The high-volume fuel pump module used in the 2012 Chevrolet Camaro ZL1 will be sold through Chevrolet Performance, giving Camaro builders access to the very latest Camaro fuel delivery technology.

Leadership in Trucks Continues

GMC Sierra and Chevrolet Silverado define truck appeal, durability and performance.

With both brands offering a broad and diverse line up of trucks ranging from job-ready Work Truck models to the luxury rides, the GMC Sierras and Chevrolet Silverados personify the American trucking experience.

Chevrolet Silverado

With a broad range of body styles, efficient powertrains and connectivity technology, the Chevrolet Silverado can be configured for just about any job – whether hauling equipment and a crew to a job site or towing a camper for a weekend getaway. The Silverado 1500 lineup is built on GM's full-size truck architecture, which supports a smooth ride and confident handling.

GMC Sierra

The 2012 GMC Sierra lineup features Vortec powertrains, backed by fuel-saving, six-speed automatic transmissions. They help Sierra models deliver among the industry's best fuel economy and performance – including up to 22 mpg on the highway for the Sierra XFE and up to 23 mpg on the highway with the segment-exclusive Sierra Hybrid.

Sierra and Silverado Powertrain Options

- **4.3L V-6** (LU3), rated at 195 hp (145 kW) and 260 lb.-ft. of torque (351Nm).
- **4.8L V-8** (L20), E85-capable with iron block; rated at 302 hp (225 kW) and 305 lb.-ft. of torque (412 Nm).
- **5.3L FlexFuel V-8** (LMG), E85-capable with iron block and Active Fuel Management, rated at 315 hp (235 kW) and 335 lb.-ft. of torque (452 Nm).
- **5.3L FlexFuel V-8** (LC9), E85-capable with aluminum block and Active Fuel Management, rated at 315 hp (235 kW) and 335 lb.-ft. of torque (452 Nm).

The Technical Side

- **6.2L V-8 (L9H),** with E85 FlexFuel capability, an aluminum block and variable valve timing, rated at 403 hp (300 kW) and 417 lb.-ft. of torque (565 Nm). This engine is available in crew cab and extended cab models.

Chassis and Suspension Details

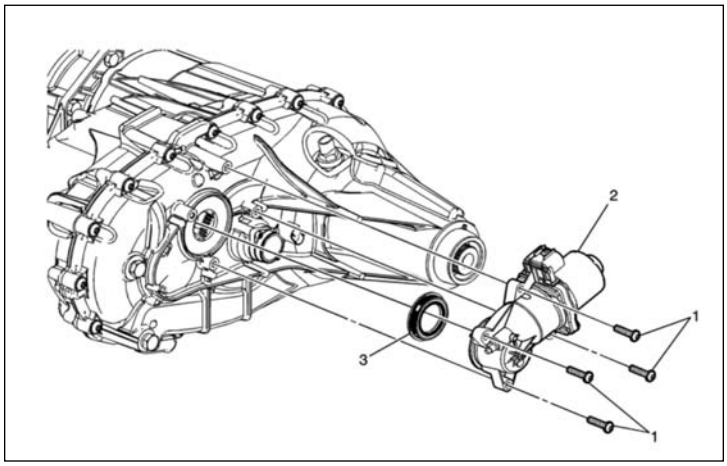
- **A coil-over-shock front suspension** delivers linear handling characteristics on all road surfaces.
- **A rack-and-pinion steering system** provides precise control and strong on-center feel.
- **A Hotchkiss-type rear suspension** provides superior isolation and ride with a splayed arrangement for the shock absorbers.
- **Four-channel ABS is standard** on all models and is linked to the StabiliTrak electronic stability control system to help mitigate the occurrence of rollover events.
- **StabiliTrak electronic stability control** system is standard on all models and now includes electronic trailer sway control and hill start assist.
- **Wide front and rear tracks** – 68.1 inches (1,732 mm) front/67 inches (1,702 mm) rear – enhance handling and vehicle stability for a more confident road feel.
- **A stiff frame** reduces vibrations transmitted to the passenger cabin, while the strength and accuracy of the fully boxed frame also enable precise mounting and tuning of chassis and suspension components.

Even though the 2012 Chevrolet Silverado and GMC Sierra are new vehicles, extensive service and repair information resources are a click away at **www.gmtechinfo.com** – *Electronic Service Information.* Technicians and shop owners can log on to the site to gain access to subscription services for service procedures and repair manuals. A complete Service Manual is accessible 24/7 through a subscription to the site.

Free collision repair procedures are also available by going to **www.genuinegmparts.com.**

Transfer Case Two/Four Wheel Drive Actuator Replacement

2012 GMC Truck Sierra - 4WD | Sierra, Silverado (VIN C/K) Service Manual | Transmission | Transfer Case - MP 3023/3024 (NQH) | Repair Instructions - On Vehicle



Preliminary Procedures

Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle.*

1 Two/Four Wheel Drive Actuator Bolts (Qty: 4)
Caution: *Refer to Fastener Caution.* Tighten 18 N·m (13 lb ft)

2 Two/Four Wheel Drive Actuator

3 Two/Four Wheel Drive Actuator Seal Procedure
1. Use J 45278 and J 23907 to remove the seal from the actuator.
2. Use the J 44907 to install the seal to the actuator.

Tip: *Remove the seal from the actuator ONLY if seal replacement is necessary.*

Special Tools: J 23907 Slide Hammer, J 44907 Bearing Installer, J 45278 Seal Remover

This example of **Transfer Case Two/Four Wheel Drive Actuator Replacement** for the GMC Sierra and Chevrolet Silverado is just one of many found in their Service Repair Manuals. By following the proper repair procedures, technicians can ensure that each vehicle maintains its solid performance and uncompromised safety features for the life of the vehicle.

San Antonio resto shop owner respects tradition as he chases perfection.

In the quest for flawless restorations, rehabs and modernization projects, Jeff Lilly, owner of Jeff Lilly Restorations in San Antonio, Texas, strives to give customers full value for the considerable sums they plop down. And he wants to justify the expenditure every step of the way, not just at delivery.

"We take a lot of photos as we move through projects so we're able to show customers, who mostly aren't local, and who are paying by the hour what we're doing and prove the work was done," he says. "Photos also keep the customer connected and involved in the restoration process."

An area of special emphasis in most projects is body structural and cosmetic work. Lilly strives for museum-quality paint finishes and structural fits that can hold up to the closest scrutiny. With resto-mods the majority of his work, Lilly is typically working with classic car customers who want to show-off, enjoy and even hand vehicles down with pride.

To achieve the perfect exterior look, he puts a premium on the painting phase – from prep to color selection to final application. Accomplished in the block sanding technique, honing it as a boy working for his father, Lilly devotes scores of hours to cultivating a base that will yield a pristine finish. Then, he applies the ideal color paint, preferably a saturated color that shows off well.

Lilly's passion is crafting a beautiful specimen. But he's no less concerned with the mechanical side of restorations. The "mod" side of his growing resto-mod business typically entails selecting and, more often than not, shoehorning modern powertrain systems into classic frames.

That's a job often made easier with OE engine and transmission systems. On GM projects, Lilly usually first looks to engines and transmission packages from Chevrolet Performance, confident they'll install well and deliver on performance.

Lilly especially likes the selection that Chevrolet Performance offers. For customers willing to pay for ultra performance, there's the LS and LSX line. For those looking to allocate more of the budget to other priorities, there are

1971 Chevelle SS wagon resto-mod

plenty of big and small blocks available.

Though he tinkered only slightly with the body design on the "Flying Purple People Seater," Lilly often lets his perfectionist side show through by tinkering with the body. Lilly's signature on classics often extends beyond producing a paint finish far outside original factory specs.

"We approach some of these projects with the idea of 'what would I have done as a GM engineer in 1969?'" he says. "So sometimes we'll reduce the size of the quarter panels, change the look of the back end, the roofline and the wheel wells. But we're careful not to customize to the point of it being a 'hey, what happened here' situation."

The voice of a perfectionist, no doubt. But one who clearly uses the pursuit of perfection to honor the bloodline of the classics he's entrusted with and the dreams of his customers.

One recent project where that tradeoff played out was this 1971 Chevelle SS wagon resto-mod. Rather than choosing an LS engine, Lilly installed a Ramjet 502. Paired with a six-speed transmission, the fuel-injected engine delivers an affordable package of substantial horsepower and torque.

"When the customer got the car he called it a real beast; he hadn't been expecting that much power," Lilly says. "That engine is built for torque and at the end of the day, that's what moves a car, not horsepower."

Choosing the more budget-friendly Ramjet gave Lilly more wiggle room to spend time on the project's cosmetics. That paid off handsomely, as he labored to give the tired, earth-toned Chevelle a new lease on life with a riveting purple paint job, black leather bucket seats, a fold-down rear seat and a 3-inch chrome exhaust.

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